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A.D. 1876, 13th May. N° 2025.

Manufacture of Dextrine-Maltose.

LETTERS PATENT to William George Valentin, of the Royal College of Chemistry, South Kensington, in the County of Middlesex, for the Invention of "Improvements in the Manufacture of Dextrine-Maltose."

Sealed the 1st September 1876, and dated the 13th May 1876.

COMPLETE SPECIFICATION filed by the said William George Valentin at the Office of the Commissioners of Patents on the 13th May 1876.

William George Valentin, of the Royal College of Chemistry, South Kensington, in the County of Middlesex. "Improvements in the Manufacture of Dextrine-Maltose."

My said Invention relates to certain improvements upon an Invention of "Improvements in the Treatment of Starch and Starchy Substances, and the Production therefrom of a Compound Body capable of being used as a Substitute for Malt in Brewing, and for other Purposes," and for which Invention, Letters Patent, bearing date the 12th day of November 1874, and numbered 3909, were duly granted to Cornelius O'Sullivan and myself.

The said Invention consisted in producing from starch or starchy substances a compound body termed "dextrine-maltose," consisting of the same proportional quantities of dextrine and maltose as are ordinarily obtained from malt by a properly conducted mashing process, such dextrine-maltose being capable of being employed with great advantage as a substitute or partial substitute for malt in brewing, and for other purposes.

In the Specification of the said Invention, filed by the said Cornelius O'Sullivan and myself, it is directed that the liquid from which the dextrine-maltose is to be obtained shall after certain processes of treatment therein described be evaporated either in vacuum pans or by any other suitable means until the compound body retains only from 4 to 5 per cent., or thereabouts, of moisture, "when on being "cooled rapidly under the diminished pressure in the vacuum pans it acquires "a crumbly, sticky semi-crystalline condition, and can, by means of stirring "apparatus added for this purpose to the ordinary vacuum pans, be removed from "the latter."

In actual practise I have found considerable difficulty in evaporating in the vacuum pan, on account of the frothing and boiling up of the liquid at the stage when the dextrine-maltose acquires a syrupy consistency. It is also difficult to obtain the dextrine-maltose as dry in the vacuum pan as it can be obtained in the

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open steam jacketed pan, unless the heating be continued for a considerable time, nor is the finished article obtained of as good a colour and appearance as when evaporated in an open pan.

My present Invention consists in evaporating the saccharine liquors in a vacuum pan only until they become sufficiently concentrated to deposit the greater part of the gypsum in a crystalline form previous to its removal by a second filtration. The evaporation of the liquor is then continued and completed in a shallow open steam jacketed pan provided with suitable stirring gear. The concentration of the saccharine liquors may likewise be conducted with advantage in an open steam pan previous to the second filtration, thus saving the cost of the expensive vacuum apparatus. Towards the end of the evaporation I blow warm and dry air, or carbonic acid gas, which is without action, upon the saccharine body through the thick syrup by means of a stirring gear, which latter consists of a hollow gun metal rod and hollow perforated plates or blades of the same metal (or of any suitable apparatus adapted for the purposes of stirring, and introduction of warm and dry air or carbonic acid gas), the plates or blades being of any suitable shape or form so arranged either horizontally or vertically as to lift and turn over the syrup in the most ready and perfect manner. The shaft of the stirring gear works in an air-tight stuffing box, and is connected with a supply of air or carbonic acid gas as before-mentioned under slight pressure. The air or carbonic acid gas can be dried without any additional expense by causing it to pass through the concentrated sulphuric acid, as is well understood in the arts, previous to its being diluted with water, in order to be employed for the conversion of the starch into dextrine-maltose, and is heated by causing it to circulate in pipes surrounded by steam, or in any other convenient manner.

When the water begins to be driven off with great difficulty, only from the dense sticky mass, that is to say, when the syrup has acquired a density of about 80 lbs. in 100, or thereabouts, I turn on the air or carbonic acid gas to the stirring gear, and force fine bubbles of the same slowly through the mass, whereby the removal of the last proportion of water is considerably facilitated and the evaporation greatly accelerated.

I have found that the action of the atmospheric air tends to oxidize the albumenoid substances which have not been removed by filtration, whereby the article manufactured is greatly improved. I have also observed that by the method of treatment before described the dextrine-maltose can be obtained almost dry and of neutral reaction, whereas the saccharine liquors before they reach their final state of concentration shew an acid reaction.

I should here remark that these observations are of great importance, inasmuch as glucoses and other artificial substitutes used in brewing are usually acid, such acid having the effect of destroying or holding in solution the albuminous bodies contained in malt, thereby interfering greatly with the separation of the yeast in the fermentation of the beer.

When the dextrine-maltose is treated in the manner herein-before described it acquires a whitish appearance, and becomes hard on cooling, instead of having an unsightly brownish sticky appearance. It is then a body which when struck breaks like glass, and when drawn out is sticky and plastic. As long as it is kept warm in the evaporating pan the dextrine-maltose remains in a thick pasty condition, and the finished article may be run out hot into suitable receptacles in which it is allowed to cool.

The advantages obtained by my said Invention, and the attainment whereof forms the object of the latter, are that a neutral manufactured article is obtained which is almost entirely free from albumenoid substances, whilst it possesses an improved color and appearance and keeps better by reason of the moisture having been all but removed. Another important advantage is that the evaporation is or can be much more rapidly conducted than by the methods previously adopted.

Having thus declared and ascertained the nature of my said Invention, and in what manner the same is to be performed, I would observe in conclusion that I do not claim all the several parts of the operations and methods of treatment herein-before described, separate and apart from each other, as being of my Invention, neither do I confine or restrict myself to the precise details herein-before set forth, inasmuch as variations may be made therefrom without departing from the main principles of my said Invention, but what I consider novel and original, and therefore claim as constituting my said Invention, are the improvements in the manufacture of dextrine-maltose, substantially as herein-before set forth and described, or any mere modifications thereof.

In witness whereof, I, the said William George Valentin, have hereunto set my hand and seal, this Thirteenth day of May, in the year of our Lord One thousand eight hundred and seventy-six.

W . GEO. VALENTIN. (L.S.)

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